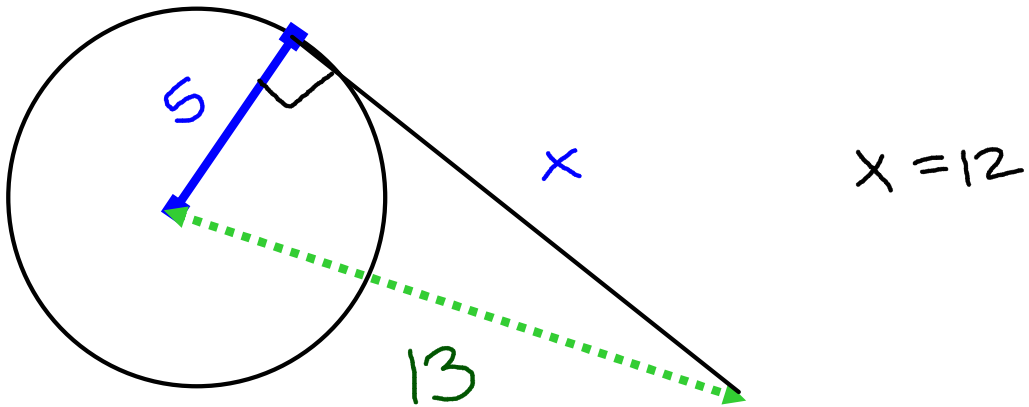
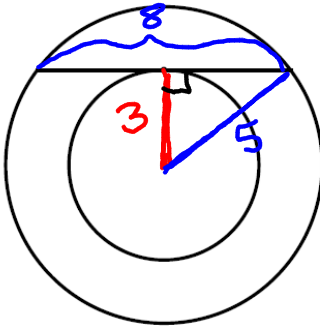


## Worksheet 8.2: Tangents

1. A point is 13 cm. from the center of a circle whose radius is 5 cm. Find the length of the tangent segment from this point to the circle.

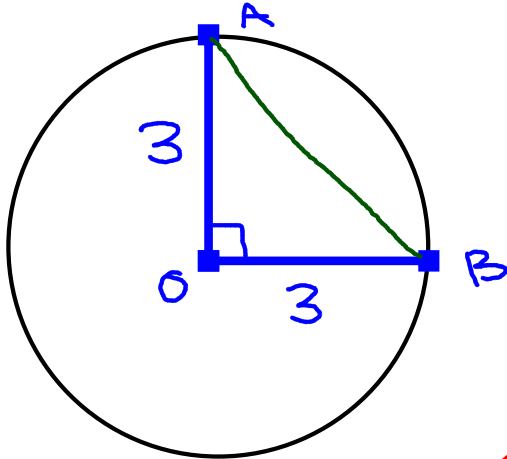


2. In the figure below the two concentric circles have radii of 3 and 5, respectively. Find the length of a chord of the larger circle which is tangent to the smaller circle.



$$\begin{aligned}3^2 + b^2 &= 5^2 \\9 + b^2 &= 25 \\b^2 &= 16 \\b &= 4\end{aligned}$$

3. In  $\odot O$ , radius  $\overline{OA} \perp \overline{OB}$ . If  $OA = 3$ , find  $AB$ .



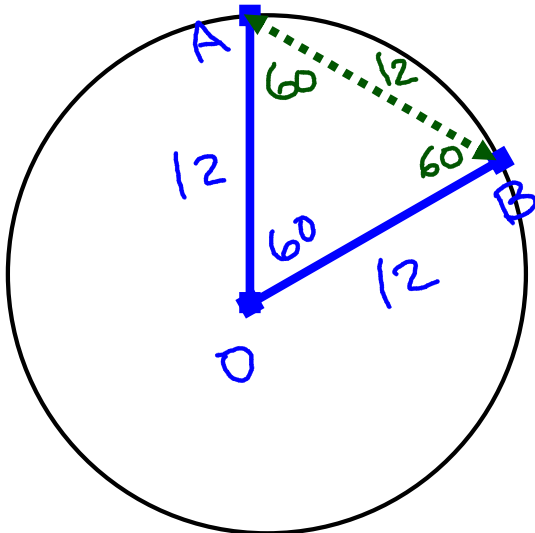
$$3^2 + 3^2 = c^2$$

$$18 = c^2$$

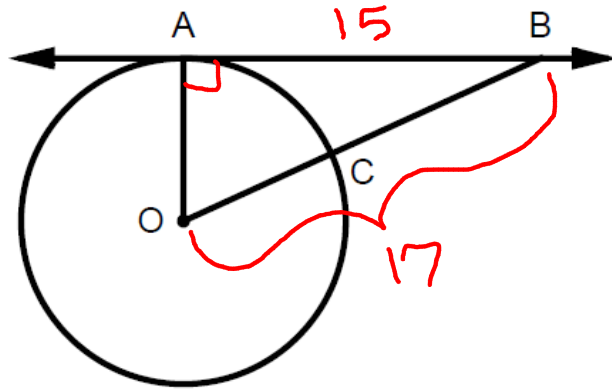
$$\sqrt{18} = c \approx 4.2$$

$$\begin{array}{c} 9 \quad 2 \\ \swarrow \quad \searrow \\ 3 \quad 3 \end{array} = 3\sqrt{2}$$

4. In  $\odot O$ ,  $\overline{OA}$  and  $\overline{OB}$  are radii and  $m\angle AOB = 60^\circ$ . If  $AB = 12$ , find  $OA$ .



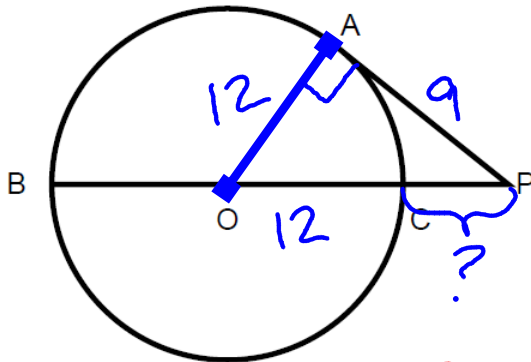
5. In the figure below,  $\overrightarrow{BA}$  is tangent to  $\odot O$  at A. Radii  $\overline{OA}$  and  $\overline{OC}$  are drawn, and  $\overline{OC}$  is extended to intersect  $\overrightarrow{BA}$  at B.



$$\begin{aligned} 15^2 + a^2 &= 17^2 \\ 225 + a^2 &= 289 \\ a^2 &= 64 \\ a &= 8 \end{aligned}$$

If  $BA = 15$  and  $OB = 17$ , find the measure of a radius of  $\odot O$ .

Questions 6 and 7 refer to the figure below. Diameter  $\overline{BC}$  is extended to point P and tangent  $\overline{PA}$  is drawn.



6. If  $OC = 6$  and  $CP = 4$ , find  $AP$ .

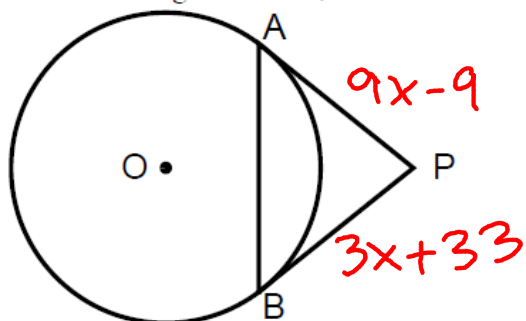
$$\begin{aligned} 6^2 + b^2 &= 10^2 \\ 36 + b^2 &= 100 \\ b^2 &= 64 \\ b &= 8 \end{aligned}$$

7. If  $OC = 12$  and  $AP = 9$ , find  $PC$ .

$$\begin{aligned} 12^2 + 9^2 &= c^2 \\ 144 + 81 &= c^2 \\ 225 &= c^2 \\ 15 &= c \\ 15 - 12 &= \boxed{3} \end{aligned}$$



10. In the diagram below,  $\overline{PA}$  and  $\overline{PB}$  are tangents to  $\odot O$  from P and chord  $\overline{AB}$  is drawn.

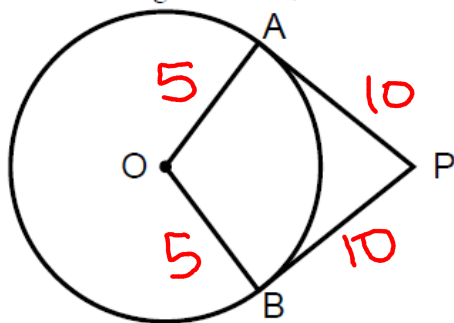


If  $PA = 9x - 9$  and  $PB = 3x + 33$ , find  $x$ .

$$x = 7$$

$$\begin{aligned} 9x - 9 &= 3x + 33 \\ -3x &\quad -3x \\ 6x - 9 &= 33 \\ +9 &\quad +9 \\ 6x &= 42 \\ \frac{6x}{6} &= \frac{42}{6} \end{aligned}$$

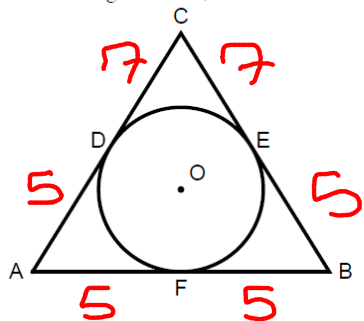
11. In the figure below,  $\overline{PA}$  and  $\overline{PB}$  are tangents to  $\odot O$ .



If  $PA = 10$  and  $OA = 5$ , find the perimeter of quadrilateral  $PAOB$ .

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12. In the figure below,  $\odot O$  is inscribed in  $\triangle ABC$  so that the circle is tangent to  $\overline{AB}$  at F, to  $\overline{BC}$  at E, and to  $\overline{AC}$  at D.



If  $AF = FB = 5$  and  $DC = 7$ , find the perimeter of  $\triangle ABC$ .

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